



Remote talks: Changes to economics seminars during COVID-19[☆]

Marcus Biermann^{*}

Bielefeld University, Germany

Centre for Economic Performance, United Kingdom

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ABSTRACT

This paper analyzes the consequences of the change in the presentation mode of economics seminars triggered by the COVID-19 pandemic. The composition of seminar speakers changed significantly. The share of seminars held by women increased. Several indicators of speaker productivity show that speakers at the top of the distribution also gained shares. The geography of knowledge dissemination shifted significantly as the distance between host and speaker institutions increased on average by 32 percent. The results imply that the opportunity to offer virtual presentations instead of traveling to deliver in-person presentations can decrease gender-specific inequality and increase inequality in favor of the “stars” within the profession.

1. Introduction

Academics and institutions alike spend a considerable amount of time and financial resources to exchange ideas in regular seminar series. For speakers, these seminars are a key means of receiving feedback, making their work more visible, and building professional networks. Therefore, the opportunity to present at seminars can have long-lasting effects for individual career paths, especially for early career researchers. Hosting institutions also benefit as they maintain the state of the art in research, and seminars provide important input in the knowledge production function. Hence, who is presenting and the topic of the presentation can shape research fields as a whole.

On March 11, 2020, the WHO declared a global pandemic after SARS-CoV-2 (“coronavirus”) had spread around the world. Subsequently, most countries issued international travel warnings, and international travel seized up.¹

As a consequence, conferences and seminars in research were canceled abruptly by the majority of organizers in the first half of March 2020. Institutions gradually started to shift their mode of seminars to online presentations using information and

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^{*} Correspondence to: Bielefeld University, Germany.

E-mail address: marcus.biermann@uni-bielefeld.de.

¹ For example, the passenger volume for flights from airports in the European Union decreased to 15 percent between 2020/Q2–2020/Q4 in terms of the volume between 2019/Q2–2019/Q4. Source: Eurostat.

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communication technology (ICT) programs such as Zoom. By the 2020 fall term, the vast majority of institutions across the world had adapted to the worldwide spread of COVID-19 through forced experimentation with holding seminars online.

There are good reasons to assume that seminars will remain partially online in the future. Even temporary experimentation can result in lasting changes in consumer behavior (Larcom et al., 2017). Barrero et al. (2021) conducted a large-scale survey among employees in the US and predicted that 20 percent of full workdays would be performed from home when the pandemic ended. The transition to remote seminars is likely to have a permanent component in a post-pandemic world as well.² Therefore, it is important to understand the implications of the forced experimentation with ICT to conduct seminars. The forced experimentation with ICT will, throughout the paper, be referred to as “COVID-19 shock”. This study addresses the following three research questions: What are the consequences of the COVID-19 shock for gender inequality between speakers? How does the COVID-19 shock affect the representation of speakers of varying productivity, where productivity is measured based on rankings or their publication output? How does the COVID-19 shock change the geography of academic seminars?

This paper builds a rich panel data set of seminars in economics held at 270 institutions across the world between fall 2018 and fall 2022. The data on seminars are complemented by rich characteristics of institutions and speakers. At the institutional level, information was collected on the number of seminars and the geography of institutions. At the speaker level, this study collected information on speaker gender, productivity, academic experience, and citations. The identification presumes that the COVID-19 shock was exogenous. The identifying variation comes from the within-seminar series comparison before and after the COVID-19 shock. The differential timing of returning to in-person seminars in the fall of 2021 and 2022 across institutions is used as an additional source of identifying variation.

This study produces four main sets of results. The first set of results shows that the number of seminars decreased overall, but even more so for lower-ranked institutions.

The second set of results highlights that the COVID-19 shock reduced gender inequality. The share of female speakers increased markedly after the COVID-19 shock, which was partially driven by the longer distances between female speakers and host institutions.

The third set of results shows that the COVID-19 shock had important distributional consequences. Speakers at the top of the productivity distribution gained shares following the COVID-19 shock. In particular, top economists in terms of recent output and top young economists held relatively more seminars. Speakers from the top of the distribution of a journal quality weighted publication score crowded out speakers from the bottom of the distribution. Using citations as a measure of impact at the speaker level, this study found that speakers from the top of the distribution supplanted speakers from the bottom middle of the distribution. At the institutional level, speakers from top institutions replaced speakers from institutions at the bottom of the distribution. Moreover, the propensity of high-productivity speakers to give seminars at lower-ranked institutions increased.

The fourth set of results reveals the implications of the COVID-19 shock by geography. The COVID-19 shock induced institutions to invite speakers from further away, and speakers were more likely to be from abroad.

This paper contributes to the literature that examines the gender inequality in the economics profession. A large body of literature shows that women are discriminated against among a range of factors that determine the professional success in the field, including publication and writing standards (Card et al. 2019, Hengel 2022), citations (Koffi, 2021), credit for group work (Sarsons et al., 2021), descriptions of job market candidates in reference letters (Baltrunaite et al. 2022, Eberhardt et al. 2023), interactions in seminars (Dupas et al., 2021), discussions in an anonymous economics online forum (Wu, 2018) and promotions and tenure decisions (Ginther and Kahn 2004, Ceci et al. 2014, Chen et al. 2022). Women graduating from a PhD program in economics are initially placed at lower-ranked schools relative to their male peers, and survey evidence suggests that the departmental seminar culture is a relevant factor in determining the relative success of women (Boustan and Langan, 2019). This study highlights that reducing the requirement to travel by holding virtual seminars could benefit female speakers, thereby potentially narrowing the gap of gender representation in seminars. Thus, this study contributes to the debate on why women are underrepresented as faculty members in the economics profession (Bayer and Rouse 2016, Lundberg and Stearns 2019, Auriol et al. 2022). The proportion of women decreases at each stage along the career path from graduate school to full professor, the so called “leaky pipeline” discussed in Buckles (2019). The results suggest that flexibility could reduce the gender representation gap, as hypothesized by Goldin (2014). More female speakers could also encourage more young female researchers to stay in the profession through role model effects (Porter and Serra, 2020).

Doleac et al. (2021) and Minondo (2020) collected data on seminars in 66 and 143 institutions, respectively. This paper contributes to this strand of literature by expanding the collection of seminars by extending the coverage and moving beyond the collection of US departments to include institutions worldwide. It documents for the first time the concentration of seminar presentations according to speaker productivity. It finds that “superstar effects” occurred in line with (Rosen, 1981), thereby increasing the inequality among researchers in the economics profession. The inequality in access to seminars is relevant as the literature has shown in the context of conferences that they can promote research collaborations (Campos et al. 2018, Chai and Freeman 2019), increase the likelihood of citing other participants (Head et al. 2019, Lopez de Leon and McQuillin 2020) and of publishing in leading journals (Gorodnichenko et al., 2021) and are a metric used by promotion and tenure committees (Chari and Goldsmith-Pinkham, 2017). Research on changes of participant characteristics in conferences of fields outside of economics during COVID-19 has found an increase in young researchers and female participants (Skiles et al., 2022) and in ethnic and geographic

² In Fall 2022, as most pandemic-related measures had been lifted, virtual online series continued to coexist with in-person seminars and some institutions held occasionally their seminars online. More than half of the seminar series listed on <https://www.aeaweb.org/resources/online-seminars> continued in fall 2022.

diversity (Wu et al., 2022). As opposed to these studies, this paper focuses on academic seminars and their speakers and contributes by documenting a rise in inequality in access to seminars based on speaker productivity.

This paper adds to the literature on alternative work arrangements. This strand of the literature has shown that women value job flexibility (for example, Mas and Pallais 2017, Wiswall and Zafar 2017) and dislike commuting (Le Barbanchon et al., 2020). The effects of working from home on worker productivity, selection, and satisfaction have so far been primarily analyzed in the context of call center workers, which is a low-paying occupation (for example, Bloom et al. 2015, Mas and Pallais 2017, Emanuel and Harrington 2021). This paper contributes by providing novel evidence on the distributional consequences of working from home in a narrowly defined high-paying occupation based on individual gender and productivity. It highlights that the reduced requirement to travel by being able to work from home could benefit women in high-paying occupations, thereby potentially narrowing the gender representation gap in higher ranks of these occupations (Bertrand and Hallock 2001, Azmat and Ferrer 2017).

Finally, many studies examine the knowledge spillover effects of local agglomeration. These spillovers are particularly relevant in research (Waldinger 2016, Iaria et al. 2018). The knowledge spillovers decrease with distance within countries (Jaffe et al. 1993, Audretsch and Feldman 1996) and across countries (Comin et al., 2012), and better travel linkages can increase scientific collaboration (Catalini et al., 2020). The findings of this paper that the distance between host and speaker institutions increases and that more presentations are correlated with more citations suggest that the detrimental effect of distance on knowledge spillovers could weaken over time if communication continues to take place remotely in the future.

The remainder of this paper is structured as follows. The next section introduces a conceptual framework to guide the analysis. The third section describes the data. The fourth section presents the results. The final section concludes and indicates directions for future research.

2. Conceptual framework

When predicting the effects of the COVID-19 shock, it is useful to think about potential demand and supply channels and how institutions and speakers will respond to the COVID-19 shock. This section also discusses heterogeneous shocks related to the pandemic.

2.1. Demand

2.1.1. The optimization problem of institutions

Hosting institutions can benefit from the quality of knowledge they receive by inviting a seminar speaker and the advantages they gain through personal exchanges with the speaker. The benefits that institutions reap from exchanges with high-productivity speakers are on average higher in terms of feedback and the learning imparted through presentations.³ At the same time, hosting institutions face budget constraints. The expenses incurred for a seminar comprise variable costs such as hotel bills and travel expenses. Some host institutions may have policies in place that restrict the travel distance of in-person seminars due to budget constraints or even environmental considerations.

2.1.2. The effects on the budget constraint and the demand for speakers

How will the COVID-19 shock affect the demand for seminar speakers? The budget constraints of institutions will become slack and hosting institutions will maximize their objectives by changing the set of speakers they invite as they will only have to pay the sunk cost of setting up the technology.⁴ In particular, once set up, institutions will pay less attention to distance, as it is no longer a financial constraint, and more attention to the quality of the speakers. This increases the competition among institutions for renowned speakers.

2.1.3. The shift in demand for female speakers

There has been a growing awareness of the unequal representation of women in the economics profession in recent years. According to Chevalier (2022), progress towards a more gender-equal representation at the junior level is evident, with the share of female assistant professors at doctoral-granting institutions in the United States increasing by 4 percentage points between 2018 and 2021. Potentially, institutions also have become more aware of the under-representation of women in economics seminars, as documented for the pre-COVID-19 shock period by Doleac et al. (2021). Institutions may want to increase the representation of women in their seminar series independently of the COVID-19 shock. If there is a positive response to the COVID-19 shock in the supply of female speakers, one would expect an increase in the share of female speakers compared to the pre-COVID-19 shock period. Following the return to in-person seminars after the COVID-19 shock, one would expect a gradual decline. However, the share of female speakers is expected to remain higher than that observed before the COVID-19 shock due to the shift in demand for female speakers.

³ Another reason to invite a high-productivity speaker could be to establish a connection that might lead to future research collaborations.

⁴ If institutions' lists of potential speakers to invite for a seminar depends on expected supply, who is actually going to accept an invitation, then the set of speakers that institutions consider inviting may change after the COVID-19 shock.

The costs of Zoom, for example, were 19.99 dollars per month for a business license in October 2021. Therefore, the sunk costs of setting up the technology are small in comparison to hosting a speaker in person.

2.1.4. The shift in demand toward seminars with “star” speakers

Researchers face a time constraint in terms of the number of seminars they can attend. Some renowned institutions with distinguished speakers opened up their seminars to interested participants who were unaffiliated with their institution. New public online seminars were established during the pandemic, hosting many speakers from top-ranked institutions. This could lead to a change in the demand for seminars among researchers from lower-ranked institutions. The opportunity to access seminars featuring well-known researchers through programs such as Zoom could attract researchers from lower-ranked institutions. This shift might lead them away from attending their institutions’ seminar series to participate in public seminars with more renowned speakers. Having the opportunity to access seminars with distinguished speakers would then lead to a concentration of seminars among all institutions and even more so for lower-ranked institutions. However, institutions may also have norms in place, whereby researchers are expected to attend their own seminar series. Researchers may value the personal interactions with the speakers as well as the opportunity to choose potential speakers according to faculty interests. These factors might explain why demand is not completely elastic.

2.2. Supply

2.2.1. The supply of female speakers

The requirement to travel may disproportionately prevent women from presenting in-person at seminars, as they tend to bear a higher share of childcare and chores compared to their male counterparts (Barber et al. 2021, Deryugina et al. 2021). This suggests an additional fixed cost for women that may increase the further away they are from the host institution, as it becomes more costly and difficult to substitute their traditionally larger share of contributions to childcare and chores for longer trips. If women had to decline more seminar invitations because of time constraints before the COVID-19 shock, then a reduction in travel constraints should increase the share of female speakers. However, the pandemic also led to significant disruptions in women’s use of their time, demanding an increase in child care responsibilities and chores. Survey evidence shows that this burden indeed fell disproportionately on women among academics (Barber et al. 2021, Deryugina et al. 2021). The need for child care increased following the COVID-19 shock, especially, for younger children, and younger academics (who typically have younger children) experienced a more pronounced impact on their time allocation (Barber et al. 2021, Deryugina et al. 2021).

2.2.2. The supply of “star” speakers

Seminar speakers tend to allocate leisure time and working time to themselves in which they produce research and present at seminars. They will maximize the quality of the feedback they receive while trying to balance the time between producing research and traveling. One reasonable assumption is that the opportunity costs to hold a seminar increase with speaker productivity and that the marginal utility of feedback decreases with productivity. Other things being equal, one expects that high-productivity speakers will receive on average more seminar invitations than they can attend and that they will choose to visit the institutions where they receive more feedback and can better advertise their papers. On average, they decline more invitations from places where they cannot promote their papers as well as they can elsewhere. How will the COVID-19 shock affect the supply of high-productivity seminar speakers? The relative supply of high-productivity speakers will increase as the opportunity costs to give a seminar decrease more for them with the COVID-19 shock. Furthermore, the time-saving effect of virtual seminars increases along with the number of seminars given by a speaker. Therefore, the effect is greater for high-productivity speakers as they gave more seminars before the COVID-19 shock. In line with the increased time savings for researchers from better-ranked institutions resulting from reduced travel, a study by Kruger et al. (2022) shows that their research output increased more during COVID-19.

2.2.3. Other factors influencing supply

Another dimension of heterogeneity among speakers is related to the increases in time spent on administrative duties (for example, as head of a department) and teaching load for most speakers due to the switching costs related to the pandemic. While these variables are generally not observable, the analysis will compare speakers of similar experience and gender to reduce dimensions of unobserved heterogeneity.

2.3. Predictions

The conceptual framework considers several channels and how they can affect different outcomes. The implications of the channels for various outcomes are summarized in Table 1.

The channels point to clear predictions for the number of seminars, the share of “star” speakers, and the distance between the hosting and speakers’ institutions. However, for the share of women, the channels can go in opposite directions.

Taken together, the discussion of demand and supply implies the following four testable predictions for observed changes due to the COVID-19 shock:

Hypothesis 1. The number of seminars will decrease overall and even more so for lower-ranked institutions.

The response in the share of women is theoretically ambiguous.

Hypothesis 2.1. The increased demand for female speakers and the flexibility resulting from the COVID-19 shock will increase the share of women speakers.

Table 1
Channels conceptual framework.

	# Seminars	Share women	Share “star” speakers	Distance
Demand				
Slack budget constraint	○	○	+	+
Female demand	○	+	○	○
Public seminars	–	○	○	○
Supply				
Flexibility	○	+	○	+
Childcare and chores	○	–	○	○
Opportunity costs	○	○	+	+

Notes: ○ indicates no effect, + indicates a positive effect, and – indicates a negative effect.

Hypothesis 2.2. The share of younger women will show a smaller increase or even a decrease under the assumption that increased childcare responsibilities and chores during COVID-19 prevented women from giving seminars.

Hypothesis 3. The share of “star” speakers will increase.

Hypothesis 4. The distance between hosting institutions and speakers will increase.

3. Data

This study identifies a balanced panel of 243 universities, 14 central banks, 11 research institutes, and 2 international organizations that recorded economics seminars in the fall of the academic years 2018/19, 2019/20, and 2020/21. A few institutions stopped holding their seminars during COVID-19 and are not included in the sample. The Online Appendix provides further details about the sampling criteria.⁵ The data include universities as hosting institutions that are, on average, larger in terms of the number of publications. The mean (median) number of publications in the Tilburg Ranking of matched host institutions that are universities is 58.07 (29), whereas the mean (median) number of publications of institutions included in the sample is 22.32 (6), i.e. higher-ranked universities were more likely to report their seminar series in the academic years 2018/19, 2019/20, and 2020/21 on their websites. Institutions account for 57.1 percent of all publications and 77.2 percent of all top 5 journal publications of institutions in the Tilburg Ranking between 2015 and 2019.⁶ While obtaining an estimate for the universe of seminars is challenging, given that some institutions do not regularly publish their seminar schedules on their websites, these figures suggest that a substantial proportion of seminars is represented in the data, as measured by publication counts. A back-of-the-envelope calculation, assuming that institutions without any record of seminars on their websites held as many seminars as adjacent-ranked institutions in the collected data, suggests that 38 percent of seminars across all institutions are covered. This represents a conservative lower bound, as some institutions did not run any seminar series. The average rank of matched host institutions that are universities in the Tilburg Ranking is 257.13, whereas the average rank of universities is 550. The average rank of central banks in the sample is 15.18 in the RePEc ranking, and is therefore quite similar to the average rank of central banks included in the search, which is 15.53. In terms of geography, the sample contains a larger share of institutions from the Americas and Europe relative to the overall population of institutions, but it has a lower share of institutions from Africa, Asia, and the Pacific region.

Overall, 12,335 seminars were hand-collected for which the full set of speaker controls is available. Additionally, 175 cancellations across all institutions were recorded.⁷ Finally, 6913 seminars in the fall of the academic years 2021/22 and 2022/23 were collected to investigate the staggered return to in-person seminars.

For each institution, the hand-collected data recorded the date on which the talk was given, the speaker, the seminar title, the speaker’s institution, the time at which the seminar was held, the host institution, the seminar series, and the academic year in which the respective talk was given. Throughout the paper, spellings of institutions and speakers across different data sets were harmonized.

The data on seminars are complemented by a rich set of characteristics at both the institutional and speaker levels.

3.1. Speakers

Rich data on speakers were collected for this study, including the year of the PhD award, gender, whether the speaker was registered on RePEc and among the top economists in its rankings, whether the speaker held an editorial role at a top journal in economics, the position of the speaker’s institution in the Tilburg ranking, and speaker’s publications and citations.

⁵ The Online Appendix contains more information on the sample definition. For universities, seminar series were collected from the websites of the respective economics department.

⁶ The top 5 journals are the American Economic Review, Econometrica, the Journal of Political Economy, the Quarterly Journal of Economics, and the Review of Economic Studies.

⁷ All recorded seminars were double-checked to guarantee the accurateness of the collection.

This study identified the year in which the PhD was obtained for 98.7 percent of the speakers.⁸ This study also determined whether the speaker was a Ph.D. student and, if so, excluded them. Speakers from institutions that are not universities were also included in the sample, provided that they held a PhD. This was done to ensure comparability in terms of research experience across speakers.

Speaker gender was determined through a machine learning based algorithm.⁹ The algorithm provides a probability of the suggested gender being true. This paper set a cutoff and trusted the algorithm for a probability greater than or equal to 95 percent when determining the gender based on the algorithm. For the remaining speakers, the proposed gender of the algorithm was hand verified. The gender could be determined for 99.9 percent of the speakers. The full set of speaker controls (experience and gender) is available for 98.4 percent of all recorded seminars.

Using the RePEc database, this study first pinpointed seminar speakers registered in the database.¹⁰ Approximately 70 percent of speakers were registered in RePEc.¹¹ For these speakers, it matched those that are ranked among the top 1 percent based on their overall research output in RePEc, the top 1 percent based on the last 10 years of publications in the RePEc database, and a ranking of 200 top young economists whose first publication in the RePEc database was no older than 10 years.¹²

Publications in 140 leading journals, according to the RePEc ranking, were obtained from Scopus.¹³ To obtain a measure of speakers' productivity, each publication was weighted by the journal score on ScimagoJR, which was then divided by the number of authors in the respective publication. For example, the ScimagoJR score of the Quarterly Journal of Economics (QJE) in 2018 was 30.49. Therefore, a speaker with a publication in the QJE with two coauthors would get 10.16 points in the publication score. All publications from 2014 to 2018 were taken into account when calculating speakers' publication scores.

The data set on editorial roles by Angus et al. (2021) was merged to the speakers. The authors used the journals that received the highest rating in the Australian Business Deans Journal Quality List in 2019 and identified researchers holding editorial roles in these journals between the end of July and the beginning of August in 2020.

The rank of the speakers' institutions in the Tilburg ranking in terms of output between 2015 and 2019 was identified.¹⁴

Finally, the speakers' Google Scholar profiles were identified and the citations for 2018, 2019, 2020, and 2021 were retrieved. A profile could be found for about 78 percent of the speakers.¹⁵ For papers presented in the academic years 2018/19 and 2019/20 citations at the paper level were collected.

3.2. Institutions

For universities featured in the Tilburg ranking, their rank in terms of output between 2015 and 2019 was retrieved. For all institutions included in the data, the latitude and longitude of the institutions were determined using Google Maps.¹⁶ Finally, the country in which an institution is located was collected.

3.3. Summary statistics

Table 2 shows summary statistics at the seminar series level and the seminar talk level in the fall term of two academic years before the COVID-19 shock in 2020/21. A total of 508 seminar series are included in the data. The average seminar series included 8.68 speakers. The share of cancellations as of all planned seminars averaged 4.5 percent. The share of cancellations of talks with female speakers averaged 1.1 percent.¹⁷

At the seminar level, 1,876 seminars or 21.8 percent of the seminars were held by 1,185 individual female speakers.

The average speaker had about 12.2 years of experience after earning a PhD award. The median and mode values of speaker experience were 9 and 4 years after their PhD award, respectively.

The top 1 percent of researchers, i.e. 615 economists, in terms of their overall output and their publication record in the last 10 years in RePEc accounted for 452 seminars (7.1 percent) and 804 seminars (12.6 percent), respectively. The 200 top young economists held 213 seminars, i.e. 3.3 percent of the seminars.¹⁸ The average publication score between 2014 and 2018 was 12.56. The average position of the speaker's institution in the Tilburg ranking was 109. Speakers affiliated with one of the top 20 institutions in the Tilburg ranking accounted for 35 percent of seminars. The number of speakers with editorial roles in top journals, excluding the top 5 journals, in the population of speakers was 1762 and their seminar share was about 18.3 percent. Likewise, 244 speakers with editorial roles at the top 5 journals comprised 6.3 percent of all seminars.

⁸ The speakers' PhDs were identified through speakers' CVs, LinkedIn profiles, the family tree of trade economists, the mathematics genealogy, speakers' PhD theses, and the CVs of supervisors. If a researcher held two PhD degrees, the PhD obtained first is recorded in the data.

⁹ The provider used is <https://gender-api.com>. See Santamaría and Mihaljević (2018) for details on the quality of the algorithm.

¹⁰ The RePEc database was accessed using <https://ideas.repec.org>.

¹¹ Male and more experienced speakers were more likely to be registered on RePEc.

¹² The RePEc rankings were retrieved in March 2021.

¹³ The RePEc journal ranking was retrieved in May 2022. Some of speakers' Scopus IDs were obtained from the data set (Rose, 2023).

¹⁴ If a speaker was affiliated with multiple institutions, then the minimum position in the Tilburg ranking was taken.

¹⁵ Doing so enabled the exclusion of profiles that erroneously contained papers from authors with the same name in other subjects among the top cited papers were excluded. One advantage of Google Scholar over Web of Science is that it also contains citations of working papers and not only citations of publications.

¹⁶ For universities, the location of the economics department was used, if such a department existed.

¹⁷ These figures are upper bounds as they are conditioned on the set of institutions that have recorded at least one cancellation between fall 2018 and fall 2020. The share of cancellations as of all planned seminars across all academic years was 1.39 percent.

¹⁸ They are a distinct group as they account for only 3.89 percent of the top 1 percent of researchers in terms of research output in the last 10 years.

Table 2
Summary statistics of dependent variables.

Dependent variables	Description	Mean	Std. dev.	Min	Max	Observations
Number of seminars _{hst}	Number of seminars at the host institution-seminar series level	8.679	5.077	1	47	1016
Share of cancellations _{ht}	Share of seminars canceled at the host institution level	0.045	0.063	0	0.375	144
Share of female cancellations _{ht}	Share of seminars canceled by female speakers at the host institution level	0.011	0.039	0	0.333	120
$\mathbb{1}(\text{Speaker is female}_{ihst})$	Dummy equal to one, if speaker is female	0.218	0.413	0	1	8612
Experience _{ihst}	Experience in years after PhD award at the time of the seminar talk	12.209	10.213	0	55	8612
$\mathbb{1}(\text{RePEc top 1 percent}_{ihst})$	Dummy equal to one, if speaker is among top 1 percent in RePEc ranking	0.071	0.256	0	1	6386
$\mathbb{1}(\text{RePEc top 1 percent last 10 yrs.}_{ihst})$	Dummy equal to one, if speaker is among top 1 percent in RePEc ranking based on publications in last 10 years	0.126	0.332	0	1	6386
$\mathbb{1}(\text{RePEc top YE}_{ihst})$	Dummy equal to one, if speaker is among top 200 young economists whose first RePEc publication is no older than 10 years	0.033	0.180	0	1	6386
$\mathbb{1}(\text{RePEc top 2-5 percent}_{ihst})$	Dummy equal to one, if speaker is among top 2-5 percent in RePEc ranking	0.217	0.412	0	1	6386
$\mathbb{1}(\text{RePEc top 2-5 percent last 10 yrs.}_{ihst})$	Dummy equal to one, if speaker is among top 2-5 percent in RePEc ranking based on publications in last 10 years	0.276	0.447	0	1	6386
$\mathbb{1}(\text{RePEc top 6-10 percent}_{ihst})$	Dummy equal to one, if speaker is among top 6-10 percent in RePEc ranking	0.184	0.387	0	1	6386
$\mathbb{1}(\text{RePEc top 6-10 percent last 10 yrs.}_{ihst})$	Dummy equal to one, if speaker is among top 6-10 percent in RePEc ranking based on publications in last 10 years	0.145	0.352	0	1	6386
Publication score _{ihst}	Publication score based on 140 leading journals in the RePEc journal ranking	12.561	12.594	0.070	120.135	6715
Residual _{ihst}	Residual from a regression of citations on gender and PhD year using data from AYs 2018/19–2020/21	-0.027	1.35	-8.505	3.993	7150
Rank speaker institution _{ihst}	Rank of the speakers' institution in the Tilburg ranking	109.44	151.73	1	910	7561
$\mathbb{1}(\text{Editorial role at top journal}_{ihst})$	Dummy equal to one, if speaker fulfills editorial role at top journal excluding the top 5 journals	0.183	0.386	0	1	8071
$\mathbb{1}(\text{Editorial role at top 5}_{ihst})$	Dummy equal to one, if speaker fulfills editorial role at top 5 journal	0.063	0.243	0	1	8612
$\ln(\text{Distance}_{ihst})$	Log of distance between host institution and speaker institution	6.832	1.958	-8.195	9.884	8043
$\mathbb{1}(\text{Speaker institution abroad}_{ihst})$	Dummy equal to one, if speaker institution is abroad	0.460	0.498	0	1	8612
Number of seminars _{it}	Number of seminars given by speaker i across 270 institutions	0.668	0.874	0	8	12,934

Notes: The table shows means, standard deviations, minima, and maxima of the dependent variables. All values are for the academic years 2018/19 and 2019/20.

Table 3

The association between the number of held and canceled seminars and the COVID-19 shock.

	(1)	(2)	(3)	(4)
	ln(Num. of seminars _{hst})	ln(Num. of seminars _{hst})	Share of cancellations _{ht}	Share of female cancellations _{ht}
1(<i>t</i> = Academic year 2020/21)	-0.125*** (0.018)	-0.164*** (0.023)	-0.005 (0.004)	0.005 (0.003)
1(<i>t</i> = Academic year 2020/21) × 1(Top 50 institution _h)		0.113 *** (0.036)		
Host institution × Seminar series FE	Yes	Yes	No	No
Host institution FE	No	No	Yes	Yes
R ²	0.791	0.793	0.295	0.310
Observations	1524	1524	216	180

Notes: Estimates of Eq. (1). The outcome in columns (1) and (2) is the log of the number of academic seminars at the host institution-seminar series level. The outcome in column (3) is the share of cancellations of planned seminars and the outcome in column (4) is the share of cancellations by female speakers of planned seminars at the host institution level. The specification in columns (1) and (2) includes a host institution-seminar series fixed effect and in columns (3) and (4) a host institution fixed effect. The independent variable of interest is a time dummy for the academic year 2020/21. The regressions are weighted by the number of seminars in the respective academic year. Standard errors in parentheses, clustered at the host institution-seminar series level in columns (1) and (2) and at the host institution level in columns (3) and (4). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4. Results

The following analysis first examines the effects of the COVID-19 shock on the number of seminars. The effects based on speaker characteristics are then investigated.

4.1. The number of seminar series

The first part of the analysis is carried out at the level of the seminar series. Let h denote the host institution, s the seminar series of the institution, and t the academic year in which the seminar was held. The estimating equation at the seminar series level is given by:

$$\text{Outcome}_{hst} = \lambda_{hs} + \beta \times \mathbb{1}(t = \text{Academic year 2020/21}) + \epsilon_{hst}, \quad (1)$$

where λ_{hs} is a host institution-seminar series specific fixed effect and ϵ_{hst} is the error term. Larger institutions offer many field-specific seminars, and this specification considers the within-seminar series change by including λ_{hs} . The coefficient estimate for β identifies the time fixed effect in the year of the COVID-19 shock relative to the pre-period. Eq. (1) identifies the effect of the COVID-19 shock, β , on seminar organization through a time fixed effect, as 79 percent of the institutions in the sample reported at least some online seminars in the academic year 2020/21. About 71 percent of hosting institutions reported only online seminars. This is most likely a conservative lower bound, as the information is missing on most other institutions' websites of the remaining institutions, or the websites may not have updated the location of the seminar. The onset of the pandemic was a sudden and unexpected event. Therefore, the necessity to switch seminars from in-person to online presentations, i.e., the COVID-19 shock, can be regarded as exogenous to institutions and speakers. Standard errors are clustered at the host institution-seminar series level. The regressions are weighted by the count of seminars to account for the different sizes of seminar series.

The first outcome in Table 3 is the logarithm of the number of seminars. The results in column (1) show a negative point estimate that is statistically significant at the 1 percent level. The point estimate suggests that during the fall term of the academic year 2020/21, on average 12.5 percent fewer seminars were held compared to before. In fact, the intensive margin effect is a lower bound for the reduction in seminars, as a few institutions stopped holding seminars. The number of individual speakers declined correspondingly by 14.6 percent from 3140 in the pre-COVID-19 shock academic year to 2682 in academic year 2020/21. Potential explanations for the drop in the number of seminars could be the substitution of institutional seminars with newly established online seminar series and increased competition between institutions for prominent speakers.¹⁹ The regression in column (2) examines heterogeneity by a dummy equal to one if the institution is ranked among the top 50 institutions in the Tilburg ranking. The decline in the number of seminars held at institutions outside the top 50 was 16.4 percent, whereas it was just 5.1 percent for the top 50 institutions. This is consistent with Hypothesis 1 of the conceptual framework, which stated that competition between institutions would lead to a larger reduction in the number of seminars at lower-ranked institutions. The following two columns rule out that speakers decreased their supply in the short run by considering cancellations.²⁰ The outcome in column (3) is the share of cancellations of all planned seminars. As the overall share of cancellations is quite low, this outcome is aggregated to the host institution level "h" across all seminar series "s" in Eq. (1). The point estimate suggests that the share of cancellations decreased by 0.5 percent but it is insignificant. This implies that contemporaneous shocks did not increase short-term cancellations of planned

¹⁹ Numerous cross-institutional virtual seminars were established as a consequence of the wide-spread use of technology. See, for example, <https://ideas.repec.org/v/> for a selection of virtual seminars. Section 4.5.10 discusses the newly established online seminars.

²⁰ If reasons for cancellations are given, they relate more frequently to the supply side. Common reasons for cancellations include family situations, illness, and weather events.

Table 4
The association between speakers' gender and the COVID-19 shock.

	(1)	(2)	(3)	(4)	(5)
	$\mathbb{1}(\text{Speaker is female}_{i,ht})$				
$\mathbb{1}(t = \text{Academic year } 2020/21)$	0.075*** (0.009)	0.057*** (0.012)	0.055*** (0.009)	0.077*** (0.012)	0.082*** (0.013)
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(1475 \text{ km} < \text{Distance}_{i,ht})$		0.032* (0.018)			
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(1475 \text{ km} < \text{Distance}_{i,ht} < 5000 \text{ km})$			0.074*** (0.022)		
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \text{Rank host institution}_i$				0.00002 (0.00006)	
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \text{Experience}_i$					-0.0006 (0.0007)
Host institution \times Seminar series FE	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes
Guest institution FE	No	Yes	Yes	No	No
Distance dummy	No	Yes	Yes	No	No
R^2	0.095	0.194	0.195	0.097	0.095
Observations	12,335	12,335	12,335	11,241	12,335

Notes: Estimates of Eq. (2). The outcome in all columns is a dummy variable equal to one, if the speaker is female. The regression in column (1) estimates the baseline effect. The regression in column (2) examines heterogeneity by a dummy equal to one if the distance between host and speaker institution is more than 1475 km. The regression in column (3) adds an upper threshold of less than 5000 km to the distance dummy introduced in column (2). The regressions in columns (4) and (5) investigate heterogeneity by the rank of the hosting institution and speakers' experience, respectively. The specifications include a host institution-seminar series fixed effect. The regressions control for speakers' experience. The specifications in columns (2) and (3) additionally control for guest institution fixed effects and the respective distance heterogeneity dummy. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

seminars; on the contrary, cancellations decreased. The outcome in column (4) is the share of cancellations by female speakers for all planned seminars. The point estimate is positive but marginally insignificant. This suggests some gender heterogeneity with respect to the short-run supply of speakers; however, the share of cancellations by female speakers did not increase statistically significantly due to contemporaneous shocks during the pandemic.

4.2. The changing composition of seminar series based on speaker gender

The following analysis is conducted at the level of the seminar talk in order to control for contemporaneous shocks at the speaker level by age and gender. Let i denote a seminar talk held by an individual speaker. Eq. (2) introduces additionally a vector X_i of controls that includes speaker experience in years after PhD award as a proxy for age and speaker gender to control for contemporaneous pandemic-related shocks to speakers of different ages and gender as discussed in Section 2.²¹ The remaining notation is the same as that introduced in Eq. (1) and the clustering remains at the level of the host institution-seminar series.

$$\text{Outcome}_{i,ht} = \lambda_{hs} + \gamma \times X_i + \beta \times \mathbb{1}(t = \text{Academic year } 2020/21) + \epsilon_{i,ht}. \quad (2)$$

The following analysis in Table 4 explores the association between speaker gender and the COVID-19 shock and therefore excludes gender from the set of controls.

The first outcome is the likelihood of the seminar speaker being female. The point estimate in column (1) is positive and significant at the 1 percent level. The coefficient estimate suggests a 7.5 percentage point increase in the relative likelihood of the seminar speaker after the COVID-19 shock being female, which is about 34.6 percent in terms of the pre-COVID-19 shock mean. The result is consistent with Hypothesis 2.1 of the conceptual framework. This finding is even more surprising considering the fact that previous research suggests a negative effect of the contemporaneous pandemic shock to women's research productivity (Barber et al. 2021, Deryugina et al. 2021, Jiang et al. 2022, Kruger et al. 2022). Furthermore, women are under-represented in the top 1 percent in terms of overall output (women represent 5 percent of the top 1 percent) and in terms of output in the last 10 years (women represent 9.2 percent of the top 1 percent) in the RePEc rankings.²² This indicates that the "superstar effects" documented below in Section 4.3 tend to benefit men disproportionately. Fig. 1 shows that the post-COVID-19 shock density of distance between host and speaker institution deviates from the pre-COVID-19 shock much earlier for women than for men at around 1475 km, and the densities cross again around 5000 km. This suggests that there are some gender-related costs of traveling to seminars and that the COVID-19 shock facilitated presentations for women at medium distances. Column (2) explores this hypothesis by examining heterogeneity by defining a dummy equal to one if the distance is greater than 1475 km. The interaction term is positive and marginally significant at the 10 percent level. The regression in column (3) considers an alternative dummy equal to one if the distance is greater than 1475 km and less than 5000 km. The magnitude of the interaction term increases and becomes significant

²¹ This study only considers seminars with one speaker. About 0.5 percent of the talks were held by multiple speakers. All results are robust, when including talks with multiple speakers. In most cases, individual outcomes cannot be uniquely determined when multiple speakers were giving a seminar.

²² The RePEc shares in the top 1 percent were retrieved from <https://ideas.repec.org/top/female.html> in March 2021.

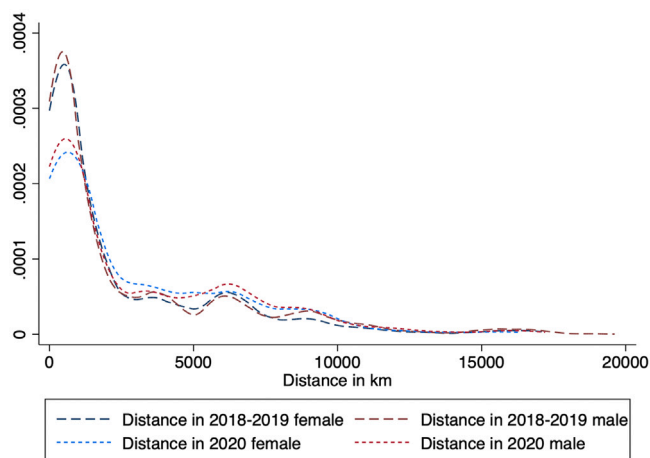


Fig. 1. Density of bilateral distances before and after the COVID-19 shock by gender.

Notes: The figure plots the density of speakers in the academic years 2018/19 and 2019/20 (before the COVID-19 shock) and 2020/21 (after the COVID-19 shock) by gender.

Table 5

The association between “superstar” speakers and the COVID-19 shock.

	(1)	(2)	(3)
	$\mathbb{1}(\text{RePEc top 1 per.}_{i,host})$	$\mathbb{1}(\text{RePEc top 1 per. 10 yrs. publ.}_{i,host})$	$\mathbb{1}(\text{RePEc top YE}_{i,host})$
$\mathbb{1}(t = \text{Academic year 2020/21})$	0.010 (0.006)	0.036*** (0.008)	0.009** (0.004)
Host institution \times Seminar series FE	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes
R^2	0.279	0.166	0.085
Observations	9087	9087	9087

Notes: Estimates of Eq. (2). The outcome in column (1) is a dummy variable equal to one, if the speaker is ranked among the top 1 percent of researchers in terms of overall output in the RePEc database. The outcome in column (2) is a dummy variable equal to one, if the speaker is ranked among the top 1 percent of researchers based on publications in the last 10 years in the RePEc database. The outcome in column (3) is a dummy variable equal to one, if the speaker is ranked among the top 200 economists whose first publication in the RePEc database is no older than 10 years. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

at the 1 percent level. This suggests that parts of the increase in the share of female speakers are driven by a supply-side response for medium-length distances. The requirement to travel a medium distance and to stay overnight may have prevented women from accepting seminar invitations more often before the COVID-19 shock. Column (4) explores heterogeneity according to the type of institution at which women held seminars after the COVID-19 shock. The point estimate is close to zero and suggests no heterogeneity in the association between the quality of institutions and speaker gender. Column (5) tests for heterogeneity by speaker experience. The interaction term is negative but small and insignificant, suggesting that the relative likelihood of the speaker being female increased for speakers of all ages.²³ This suggests that younger female speakers experienced a similar increase compared to other female speakers, contradicting Hypothesis 2.2 of the conceptual framework.

4.3. The changing composition of seminar series based on speaker productivity

Overall, there are fewer opportunities for speakers to present. This section shows the implications of the COVID-19 shock for the composition of seminar series by five proxies of speaker productivity. The proxies are speakers identified as top economists in RePEc, by their quality-weighted publications between 2014 and 2018, by their impact in terms of citations between 2009 and 2018, the position of speakers' institutions in the Tilburg ranking, and speakers holding an editorial role at top journals in economics.

The results in Table 5 show how the shares of top-ranked economists in the RePEc ranking change. The first two columns examine the change in presentations by leading researchers as measured by placement among the top 1 percent in two types of RePEc rankings. The first ranking considers the overall RePEc output of researchers in economics. The coefficient estimate in column (1) is marginally insignificant (p -value 0.1002). Its magnitude suggests that the relative likelihood of this group to give a seminar talk

²³ There is also no heterogeneity by quartiles of academic age when considering a dummy for female speaker as the outcome. The association between speaker experience and the COVID-19 shock is negative and insignificant. Unreported results available upon request.

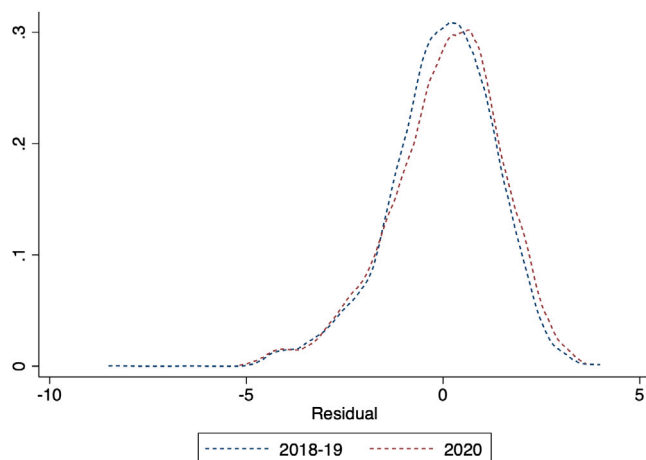


Fig. 2. Density of regression residuals for citations.

Notes: The figure plots the density of the residuals from a regression of the inverse hyperbolic sine of citations on speaker gender and the PhD graduation year in the academic years 2018/19 and 2019/20 (before the COVID-19 shock) and 2020/21 (after the COVID-19 shock).

increased by 1 percentage point, or 13.5 percent of the pre-COVID-19 shock mean. The second ranking places economists in terms of their research output in the last 10 years. The results in column (2) show a positive and significant coefficient at the 1 percent level. The point estimate implies an increase of 3.6 percentage points, or 28.8 percent in terms of the pre-COVID-19 shock mean. The third outcome is a dummy equal to one if the seminar speaker is among 200 top young economists whose first publication on RePEc is no older than 10 years. The point estimate for the academic year 2020/21 is positive and significant at the 5 percent level. Its magnitude suggests a 0.9 percentage point increase in the relative likelihood of holding a seminar as a top young economist, or 28.4 percent in terms of the pre-COVID-19 shock mean. Overall, superstar effects arise at the top of the distribution for all three types of categories. The effects are significant only for rankings based on recent research output.

The outcomes so far have been used to analyze the changes in shares for speakers at the top of the productivity distribution. Who loses shares when the top gains? To address this question, the outcomes in Table 6 present the change in speaker productivity proxied by publication output between 2014 and 2018. The sample only includes speakers who have at least one publication between 2014 and 2018 in 140 leading journals according to the RePEc ranking and speakers who obtained their PhD by 2018. The result in column (1) shows that the publication score increased by 1.25 points using the ScimagoJR score as journal weights. The outcomes in column (2) to (5) investigate the reallocation across four quartiles in terms of publication output. The likelihood of a speaker being from the first quartile in terms of publication output increased by 3.4 percentage points after the COVID-19 shock. The point estimates in columns (3) and (4) are negative and insignificant. However, the coefficient estimate in column (5) is negative and significant at the 5 percent level. Its magnitude suggests that the likelihood of the speaker coming from the bottom quartile of the publication score decreased by 2.5 percentage points after the COVID-19 shock. The regression in column (6) examines heterogeneity based on speaker gender. The interaction term is negative and insignificant suggesting a similar increase in speaker productivity across genders.

Table 7 considers the residual from a regression of citations between 2009 and 2018 on the speaker experience and gender.²⁴ Fig. 2 displays the residual by pre-COVID-19 shock and after the COVID-19 shock occurred. The distribution of the residual is shifted to the right in the academic year 2020/21 relative to the pre-COVID-19 shock period. Speakers at the top of the residual distribution gain at the cost of speakers at the bottom middle of the distribution.

The results in Table 7 are in line with the visual impression. The first outcome in column (1) is the residual. The point estimate is positive and significant at the 1 percent level. This implies that speakers had a higher impact in terms of citations after the COVID-19 shock. The outcomes in column (2) to (5) examine the reallocation of speakers in terms of the pre-COVID-19 shock distribution of the residual. The point estimate for the first quartile is positive and significant at the 1 percent level. It suggests that the likelihood of a speaker being from the first quartile of the distribution increased by 3.6 percentage points after the COVID-19 shock. The point estimates for the remaining quartiles are negative. However, only the point estimate in column (4) for the third quartile is statistically significant at the 5 percent level. This implies that speakers from the bottom middle were crowded out by speakers from the top quartile of the residual distribution. The specification in column (6) examines heterogeneity by speaker gender. The point estimate for the interaction between the COVID-19 shock and speaker gender is positive but insignificant.

How is the inequality between speaker institutions affected? The outcomes in Table 8 use functions of the rank of the speaker institutions that is available for speakers employed at universities.

²⁴ The results are similar when introducing speaker fields from RePEc as additional control variables.

Table 6

The association between publication score and the COVID-19 shock.

	(1)	(2)	(3)	(4)	(5)	(6)
	Publication score _{ihst}	$\mathbb{1}(\text{Publication score in Q1}_{ihst})$	$\mathbb{1}(\text{Publication score in Q2}_{ihst})$	$\mathbb{1}(\text{Publication score in Q3}_{ihst})$	$\mathbb{1}(\text{Publication score in Q4}_{ihst})$	Publication sc. _{ihst}
$\mathbb{1}(t = \text{Academic year 2020/21})$	1.254*** (0.313)	0.034*** (0.011)	-0.006 (0.010)	-0.004 (0.009)	-0.025*** (0.009)	1.329*** (0.360)
$\mathbb{1}(t = \text{Academic year 2020/21})$ $\times \mathbb{1}(\text{Speaker is female}_{ihst})$						-0.313 (0.554)
Host institution \times Seminar series FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.206	0.191	0.055	0.094	0.154	0.206
Observations	9456	9456	9456	9456	9456	9456

Notes: Estimates of Eq. (2). The outcome in columns (1) and (6) is the speakers' publication score for publications in 140 leading journals according to the RePEc journal ranking. The outcomes in columns (2)–(5) are dummies equal to one, if the speakers' publication score is in the respective quartile, with the first quartile comprising the highest publication score. The specification in column (6) examines heterogeneity by speaker gender. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 7

The association between speaker citation residual and the COVID-19 shock.

	(1)	(2)	(3)	(4)	(5)	(6)
	Residual _{ihst}	$\mathbb{1}(\text{Residual } Q1_{ihst})$	$\mathbb{1}(\text{Residual } Q2_{ihst})$	$\mathbb{1}(\text{Residual } Q3_{ihst})$	$\mathbb{1}(\text{Residual } Q4_{ihst})$	Residual _{ihst}
$\mathbb{1}(t = \text{Academic year } 2020/21)$	0.076*** (0.026)	0.036*** (0.011)	-0.006 (0.009)	-0.021** (0.009)	-0.009 (0.010)	0.064** (0.030)
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{Speaker is female}_{ihst})$						0.047 (0.055)
Host institution \times Seminar series FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.167	0.130	0.058	0.067	0.120	0.167
Observations	10,205	10,205	10,205	10,205	10,205	10,205

Notes: Estimates of Eq. (2). The outcome in columns (1) and (6) is the residual from a regression of the inverse hyperbolic sine of citations on speaker gender and the PhD graduation year. The outcomes in columns (2)–(5) are dummies equal to one, if the speaker productivity is in the respective quartile of the cumulative distribution function of the residuals. The specification in column (6) examines heterogeneity by speaker gender. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 8

The association between speaker institutions' rank and the COVID-19 shock.

	(1)	(2)	(3)	(4)	(5)	(6)
	Rank speaker inst. _{ihst}	$\mathbb{1}(\text{Speaker inst. Q1}_{ihst})$	$\mathbb{1}(\text{Speaker inst. Q2}_{ihst})$	$\mathbb{1}(\text{Speaker inst. Q3}_{ihst})$	$\mathbb{1}(\text{Speaker inst. Q4}_{ihst})$	Rank speaker inst. _{ihst}
$\mathbb{1}(t = \text{Academic year 2020/21})$	-7.986*** (3.069)	0.021** (0.011)	0.015 (0.010)	-0.017* (0.009)	-0.020** (0.008)	-4.903 (3.447)
$\mathbb{1}(t = \text{Academic year 2020/21})$ $\times \mathbb{1}(\text{Speaker is female}_{ihst})$						-11.475* (6.395)
Host institution \times Seminar series FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.313	0.221	0.069	0.097	0.239	0.313
Observations	10,835	10,835	10,835	10,835	10,835	10,835

Notes: Estimates of Eq. (2). The outcome in columns (1) and (6) is the rank of the speakers' institution in the Tilburg ranking. The outcomes in columns (2)–(5) are dummies equal to one, if the speaker institution is in the respective quartile, with the first quartile comprising the best institutions in the Tilburg ranking. The specification in column (6) examines heterogeneity by speaker gender. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 9
The association between seminars by editors and the COVID-19 shock.

	(1)	(2)
	$\mathbb{1}(\text{Editorial role at top journal}_{i, \text{host}})$	$\mathbb{1}(\text{Editorial role at top } 5_{i, \text{host}})$
$\mathbb{1}(t = \text{Academic year } 2020/21)$	0.003 (0.008)	0.021*** (0.006)
Host institution \times Seminar series FE	Yes	Yes
Individual-level controls	Yes	Yes
R^2	0.151	0.090
Observations	11,473	12,335

Notes: Estimates of Eq. (2). The outcome in column (1) is a dummy variable equal to one, if the speaker fulfills an editorial role at a top journal excluding the top 5 journals. The outcome in column (2) is a dummy variable equal to one, if the speaker fulfills an editorial role at a top 5 journal. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The first outcome in column (1) is the position of the speaker institutions in the Tilburg ranking. The point estimate is negative and significant at the 1 percent level. It suggests that the position of the speaker institution decreased modestly by about 8 positions after the COVID-19 shock, i.e., the quality of the speakers' institutions increased. The outcomes in column (2) to (5) show a reallocation of shares from speakers from institutions with the lowest number of publications (third and fourth quartile) to speakers based at institutions that have the highest number of publications (first quartile). The point estimate for the second quartile has a positive sign but is insignificant. Table A.1 presents a comparison of the average position of the host institution in the Tilburg ranking before and after the COVID-19 shock based on quartiles of the rank of the speaker's institution. The average rank of the host institution increased significantly by 11 positions for speakers affiliated with an institution in the first quartile. For speakers from institutions in the second to fourth quartiles there are no statistically significant differences in the rank of the host institution. This is consistent with a more significant decrease in the opportunity costs of giving a seminar or with a lower marginal utility from feedback for high-productivity speakers. As the time required to present in a seminar decreases, they are more willing to accept invitations from institutions of lower average quality. Speakers from higher average quality institutions gave more seminars at institutions of lower average quality, whereas female speakers generally gave more seminars. Overall, the results in Table 8 suggest a gradient according to institutional quality and a crowding out of speakers from institutions with few publications by speakers from institutions with many publications. The regression in column (6) investigates heterogeneity by speaker gender. The magnitude of the baseline effects implies a reduction of 4.9 positions and the coefficient turns marginally insignificant. The interaction term is negative and significant at the 10 percent level. Its large magnitude suggests that the rank of the speaker institution for female speakers decreased on average by 11.5 positions more compared to that of male speakers.

The results in Table 9 depict the changing shares of speakers that held editorial roles at top journals in economics and at the top 5 journals. The outcome in column (1) is a dummy equal to one if the speaker held an editorial role at a top journal, excluding the top 5 journals.²⁵ The point estimate is positive but small and insignificant. The outcome in column (2) is a dummy equal to one if the speaker held an editorial role at a top 5 journal. The coefficient estimate is positive and significant at the 1 percent level. It suggests a significant increase by 2.1 percentage points, or 33.9 percent in terms of the pre-COVID-19 shock mean. Institutions might increase the demand for speakers with editorial roles to receive feedback on their current research. As for the supply side, speakers from these journals may have relatively more time to hold seminars due to the COVID-19 shock. The results in this section confirm the third prediction of the conceptual framework that high-productivity speakers gain shares.

4.4. The changing geography of seminar series

Moving from in-person to virtual seminar presentations has led to literally zero travel costs for seminar speakers to participate in seminars in any location worldwide, apart from potential coordination costs due to time zone differences. What are the consequences of the COVID-19 shock regarding the geography of seminars?

The results in Table 10 show the changing geography of seminar presentation mode during the pandemic by using the log of the geodetic distance as the outcome.²⁶ The coefficient estimate in column (1) is positive and significant at the 1 percent level. The magnitude suggests a huge increase by 31.3 percent in geodetic distance relative to the pre-COVID-19 shock period.²⁷ This is in line with the fourth prediction of the conceptual framework. Column (2) examines heterogeneity among universities as hosting institutions based on the position in the Tilburg ranking. The interaction term is small and insignificant. Column (3) examines heterogeneity according to the position of the speaker's institution in the Tilburg ranking. The rank enters negatively, i.e., speakers

²⁵ The data come from Angus et al. (2021). The five most frequent editorial roles include advisory editor, associate editor, co-editor, editorial board member, and editor.

²⁶ The geodetic distance between institutions is calculated by using the coordinates and the geodist command in Stata.

²⁷ In unreported results, a gravity equation at the institutional level was estimated and the distance elasticity decreased from 0.514 in 2018/19 to 0.417 in 2020/21.

Table 10
The association of distance between host and speaker's institution and the COVID-19 shock.

	(1)	(2)	(3)
	ln(Distance _{host})		
$\mathbb{1}(t = \text{Academic year } 2020/21)$	0.313*** (0.049)	0.299*** (0.061)	0.417*** (0.055)
$\mathbb{1}(t = \text{Academic year } 2020/21) \times$ Rank host institution _h		0.0002 (0.0003)	
Rank speaker institution _{ist}			-0.0009*** (0.0002)
$\mathbb{1}(t = \text{Academic year } 2020/21) \times$ Rank speaker institution _{ist}			-0.0012*** (0.0003)
Host institution \times Seminar series FE	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes
R ²	0.201	0.202	0.213
Observations	11,533	10,543	10,128

Notes: Estimates of Eq. (2). The outcome in column (1) is the physical distance between the speakers' institution and the host institution. Column (2) examines heterogeneity by the rank of the host institution in the Tilburg ranking. Column (3) shows heterogeneity by the rank of the speaker's institution in the Tilburg ranking. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variable of interest is a time dummy for the academic year 2020/21. Standard errors in parentheses, clustered at the host institution-seminar series level. * p < 0.1, ** p < 0.05, *** p < 0.01.

from higher-ranking institutions generally travel to institutions further away. The interaction term between the time fixed effect and the rank of the speaker institution is also negative, suggesting that speakers from higher-ranking institutions gave seminars virtually at physically more distant institutions after the COVID-19 shock. The increase in distance for a speaker affiliated with a top 10 institution is close to 42 percent, whereas the effect dissipates when the speaker comes from an institution ranked 350th in the Tilburg ranking. All in all, the results suggest that geographic knowledge dissemination has increased globally, and in particular through speakers affiliated with higher-ranking institutions.

What locations are driving the increase in distance between host institution and speaker institution? Table A.2 shows the changes in seminars between the academic years 2018/19, 2019/20, and 2020/21 among the five most frequent continent combinations in the pre-COVID-19 shock year. There is only one continent combination for which the number of seminars actually increased in 2020/21. The most significant surge was seen in seminars held by speakers from institutions in Europe hosted by institutions in the Americas by 67.2 percent.²⁸

Table A.3 examines whether the increase in distance also translated into a relative increase in seminars across borders. The country codes of the host institution and the speaker institution were retrieved for this purpose. The estimate in column (1) shows that there was a positive increase in the share of seminars organized across borders during the pandemic. The point estimate implies a 4.7 percentage point increase, or a modest rise of 10.1 percent in terms of the pre-COVID-19 shock mean.²⁹

4.5. Robustness checks

This section exposes the results to a number of robustness checks beginning with the results for speaker gender before examining the robustness of the results for superstar effects.

4.5.1. Robustness checks for the effects on speaker gender

In this subsection, the robustness of the effect of the COVID-19 shock on speaker gender is examined. The results are presented in Table A.4. The results in column (1) display estimates from a logit regression. The point estimate is significant at the 1 percent level and suggests an increase in the log odds ratio that the speaker was female by 0.44. The regression in column (2) excludes seminars that were rescheduled from spring to fall in 2020. The point estimate is similar to the baseline estimate in Table 4 and remains statistically significant at the 1 percent level. The specification in column (3) excludes seminars with pandemic-related titles. Again, the point estimate is comparable to the baseline estimate and is statistically significant at the 1 percent level. The regression in column (4) shows the robustness of the effect of the COVID-19 shock on speaker gender when controlling for speaker fields using RePEc data. The regression in column (5) confirms that the result is robust to restricting the sample to hosting institutions

²⁸ The number of seminars by speakers from the top 10 US institutions in the Tilburg ranking at European host institutions increased by 16 percent in 2020/2021 compared to 2019/2020.

²⁹ In unreported results, time zone differences were investigated. There is no change in time zone difference after controlling for the log of distance, suggesting that time zone differences are on average no friction. The effects of time zone differences become negative and significant from 9 h (the 95th percentile of time zone differences). However, the magnitude suggests a small reduction of 1 percentage point in the likelihood of holding a seminar after the COVID-19 shock relative to the pre-period.

that explicitly reported online seminars on their website. The regression in column (6) excludes speakers from the top 1 percent of women in RePEc in terms of recent research output. The point estimate remains statistically significant at the 1 percent level. This suggests that the increase in female speakers is not entirely driven by a few female superstar speakers.

4.5.2. Estimating the “superstar” effect using logit regression

All regressions concerning the “superstar” effect were estimated using a linear probability model to ease the interpretation of the coefficient estimates. Table A.5 shows the estimates using logit regressions instead of linear regressions. The results are similar to the baseline estimation. The coefficient estimate for the top 1 percent in terms of overall output is positive but marginally insignificant. The point estimates for the top 1 percent in terms of recent output and for top young economists are positive and significant at the 1 percent level. The point estimate in column (2) suggests that the log odds ratio increased by 0.35.

4.5.3. Alternative definitions of “superstar” speakers

The baseline definition of superstar speakers comprised the top 1 percent of speakers registered in the RePEc database. In Table A.6, the top 2 to 5 percent and the top 6 to 10 percent in terms of overall RePEc output and in terms of output in the last 10 years are used as alternative definitions of superstar speakers. Table 2 documents that the seminar presentation share of these groups is significantly larger compared to their share in the population. The point estimate in column (1) using the top 2 to 5 percent in terms of overall RePEc output as the outcome is negative and insignificant. The coefficient estimate using the top 2 to 5 percent in terms of output in the last 10 years as the outcome in column (2) is positive and insignificant. This suggests that gains in shares were concentrated among the top 1 percent in terms of recent research output. The result in column (3) for the top 6 to 10 percent in terms of overall RePEc output shows a negative and significant coefficient at the 5 percent level. The coefficient estimate in column (4) is negative and insignificant. This implies that superstar effects quickly disappear as one considers higher percentiles of productivity distribution. The regressions in columns (5) and (6) split the 200 top young economists into the ranks of 1 to 100 and 101 to 200. The point estimate in column (5) is positive and statistically significant at the 10 percent level, whereas the point estimate in column (6) is positive but insignificant. This suggests that for top young economists, the gains in seminar shares are also concentrated among the top of the distribution.

4.5.4. Excluding seminars rescheduled from spring to fall

Approximately 9.5 percent of seminars in fall 2020 were rescheduled from spring 2020. These seminars have been included in the analysis so far, as the decision to reschedule is an endogenous choice. This robustness check excluded these seminars and the conclusions remain the same. The results presented in Table A.7 are by and large similar to those of Table 5. This is reassuring, as the distribution of speaker characteristics in the spring could be generally differ from the distribution in the fall. The magnitude of the coefficient estimate in column (1) increases and it becomes statistically significant at the 5 percent level.

4.5.5. Excluding seminars with pandemic-related titles

Another concern is whether the demand for certain topics changed due to the pandemic, and whether the ability of speakers to write papers on the contemporaneous event correlated with productivity or research interests. As a robustness check, all seminars in the academic year 2020/21 with pandemic-related topics are excluded.³⁰ About 5.2 percent of seminar titles in the fall of 2020 are pandemic-related.³¹ The results in Table A.8 are robust to excluding pandemic-related titles. The point estimate for the effect in terms in the last 10 years is smaller compared to the baseline coefficient, which could suggest a quicker shift in the research output of high-productivity researchers to pandemic-related research.

4.5.6. Controlling for speaker fields

There could be a change in the demand for speakers from certain fields due to the pandemic, and the specialization of high-productivity economists may correlate with that change. The regressions in Table A.9 control for 97 fields defined by RePEc.³² The results are robust for speakers in the top 1 percent in terms of output in the last 10 years and for top young economists.

4.5.7. Reporting of virtual seminars

The estimation so far assumed that the vast majority of seminars were held online and did not take into account the explicit reporting of online seminars. About 79 percent of hosting institutions explicitly reported on their websites that some of their seminars were held online. This is likely a lower bound as not all institutions updated the location of their seminars during COVID-19. About 71 percent of hosting institutions reported only online seminars. The results in Table A.10 restrict the sample to hosting institutions that reported that at least some of their seminars were held online. The point estimates are similar to the baseline results in terms of sign and significance. The point estimates increase marginally in magnitude.

³⁰ Pandemic-related topics are broadly defined and include, apart from “Covid”, many other key words such as “SIR” for SIR models or “epidemic”.

³¹ The paper title is available for approximately 85 percent of seminars in the academic year 2020/21.

³² The RePEc database identifies the specialization of registered authors based on two criteria. First, an author is assigned to a field if the author has written at least five papers in that field. Second, authors are classified as specialists if they have written a minimum of 25 percent of their articles in the respective field.

4.5.8. Ruling out selection effects

The results in Table 3 show a decrease in the number of seminars. Hence, superstar effects could be driven by a selection effect, i.e., those seminar series that reduce their number of seminars invite fewer speakers that are not superstar speakers while keeping the number of superstar speakers constant. One way of testing this argument is to consider only the subset of seminar series where the number of seminars in the academic year 2020/21 is greater than the average of the academic years 2018/19 and 2019/20. Table A.11 shows that when imposing this sample restriction, superstar effects remain robust. The coefficient in column (1) is positive and insignificant. The results are robust for speakers in the top 1 percent in terms of output in the last 10 years and for top young economists. The point estimates are larger compared to those in Table 5.

4.5.9. Using the return to in-person seminars to account for time trends

Another concern is that preferences for female speakers or more productive speakers change over time. Hence, the estimation of time-fixed effects may not reflect the effect of remote seminars but rather the continuation of a trend. To address this concern, the seminars in the fall of 2021 were collected for 244 hosting institutions. Overall, 2881 seminars were collected for which the mode of presentation, i.e. in-person or online, could be determined and 55.6 percent of seminars were held online. A check using the archive suggests that the vast majority of seminars (more than 95 percent) were intentional, i.e. planned as online seminars, and not spontaneously switched to online seminars. There was also no change in the number of cancellations in the fall of 2021. The specification in Table A.12 follows the structure of Eq. (2) and uses a dummy equal to one if the presentation was held online in the fall of 2021 as the outcome variable. It additionally controls for the inverse hyperbolic sine of distance. The results in column (1) show that more experienced speakers and female speakers were more likely to present online. The regression in column (2) additionally controls for the rank of the speaker institution to account for the quality of the speaker. The point estimate for female speakers suggests that they were 5.1 percentage points more likely to present online. The point estimate for the rank of the speaker's institution suggests that speakers from higher-ranking institutions were also more likely to present online, but it is insignificant. The regression in column (3) controls for the interaction between host country and speaker country fixed effects to account for any bilateral travel restrictions that may still have been in place in the fall of 2021. The effect for female speakers barely changes and remains significant at the 1 percent level.

The results in Table A.13 show that more productive speakers select themselves into online seminars. The results in columns (2) and (3) imply that "superstar" speakers were more likely to present online. For example, the result in column (2) suggests that the top 1 percent in terms of recent output were 7 percentage points more likely to present online. The results in columns (4) and (5) highlight that speaker productivity measured by publications and citations positively and significantly correlates with online presentations. Finally, the findings in columns (6) and (7) suggest that both editors of top journals and of the top 5 journals were more likely to present online.

4.5.10. Comparing the speakers of public seminars to institutional seminars

One further concern is that seminar speakers who are underrepresented in institutional seminars after the COVID-19 shock select themselves into the newly established online seminar series that are open to the public and are often not associated with an institution such as the "Chamberlain seminar" or the "Virtual Macro Seminar". In order to address this issue, this study accessed the schedules for 31 online seminar series and compared them to the 509 institutional seminar series.³³ The distributions of institutional and public seminars look by and large quite similar (Table A.14). Overall, there are four significant differences in means. The most salient difference is the difference in the rank of the seminar speakers' institutions. On average, speakers in public seminar series were from institutions that were ranked 51 positions lower. In addition to the increased inequality in existing seminars due to the COVID-19 shock, this suggests an additional dimension of inequality across institutions due to the introduction of public seminar series.

4.5.11. Conferences

While it is beyond the focus of this study to systematically examine all conferences in economics, the Online Appendix discusses a particular high-profile conference, the NBER Summer Institute. The results regarding geographic distance and the gender of discussants go in the same direction as they do for the seminars (Table A.15).³⁴

4.5.12. Job market seminars

This study focused on invited seminars. The Online Appendix discusses the before and after comparison of flyouts for 33 positions in the academic job market in the winter of 2020 and 2021. The results are presented in Table A.16. There was no change in the likelihood of a female candidate participating in a flyout. The candidates of flyouts were from institutions that were statistically significantly higher ranked. The distance between the candidate and the recruiting institution increased but not significantly. Hence, the effects of virtual presentations on recruitment differ for the gender of candidates compared to the increase in female speakers discussed in the context of invited seminars.

³³ A list of 31 online seminars included in the comparison is available upon request.

³⁴ Skiles et al. (2022) document an increase in participants in conferences in sciences and engineering. This study finds an increase in the number of participants at the NBER Summer Institute by 47.6 percent in 2021 relative to 2019.

4.6. The composition of seminars following the return to in-person seminars

Did the changes with respect to the gender composition, speaker productivity, and geography persist as seminars returned to in-person presentations in the academic years 2021/22 and 2022/23?

Table 11 displays estimates of a dynamic specification specifying additional dummies for the academic years 2021/22 and 2022/23. In the academic year 2021/22, 55.5 percent of seminars were held online, and in the academic year 2022/23, 10.7 percent of seminars were held online. The estimation sample consists of 233 institutions for which the panel is balanced.

The results in column (1) show that the likelihood of the speaker being female increased by 7.4 percentage points in the academic year 2020/21 and that there was still an increase by 4.9 percentage points in the academic year 2022/23. The point estimate for the academic year 2022/23 is statistically different from that of the academic years 2020/21 and 2021/22 at the 5 percent level. Overall, this implies a decrease in the likelihood that the speaker was female with the return to in-person seminars. However, the share of female speakers continued to be higher than before the COVID-19 shock, and there is some hysteresis.³⁵ This may also reflect that the profession has become more aware of the unequal gender representation over the recent years and that efforts are being made to increase the representation of women in economics seminars, as discussed in Section 2.1.3.

Columns (2) to (4) report the results of a dynamic specification using the shares of top-ranked economists in the RePEc ranking as outcomes. The results show that in the academic year 2021/2022, there was still an increase for the top 1 percent in terms of recent output and for the top young economists. When most of the seminars returned to in-person presentations in the academic year 2022/23, the estimates turn negative and significant in columns (2) and (3) and insignificant in column (4). Hence, “superstar” effects quickly disappeared with the return to in-person seminars.

Finally, the results in column (5) show a statistically significant increase of 12.7 percent in distance in the academic year 2021/22. However, the point estimate falls to 5.6 percent and turns insignificant for the academic year 2022/23. Thus, when seminars returned to being in-person, the role of travel frictions was similar to what it had been before the COVID-19 shock.

4.7. The increasing inequality based on speaker characteristics

Did the changing shares also translate into more seminars being given by women and leading researchers, or was the increase only in relative terms? The answer is not obvious, as the intensive margin of seminars decreased by 12.5 percent.

To tackle this question, this study builds a panel data set of all speakers in the sample between the academic years 2018/19 and 2020/2021. It identifies the number of seminars given in the fall of each academic year by seminar speakers. If a seminar speaker does not appear in a given year, the number is replaced as zero. The following equation identifies the effects for different types of individuals.

$$\begin{aligned} \text{Number of seminars}_{it} = & \mu_i + \lambda_t + \gamma_t \times X_i \\ & + \beta \times \mathbb{1}(t = \text{AY } 2020/2021) \times \text{Speaker characteristic}_i + \epsilon_{it}. \end{aligned} \quad (3)$$

It includes individual fixed effects μ_i and time fixed effects λ_t . Furthermore, it interacts the year in which the PhD was obtained and speaker gender with time fixed effects to control for contemporaneous shocks along these dimensions. The coefficient of interest is β , which identifies the differential effect of the COVID-19 shock based on speaker characteristics. Standard errors are clustered at the individual level. The results in Table 12 show that for female speakers, top economists in terms of overall output, top economists in terms of recent output, and editors at top 5 journals, the increase in shares also increased the number of seminars significantly. The magnitudes range from 0.22 additional talks for female speakers to 0.40 additional talks for editors of top 5 journals. The magnitudes do not look quantitatively significant at first sight. However, the average number of seminars given before the COVID-19 shock was 0.67 and in relation to this figure this corresponds to a 33 percent and 61 percent increase, respectively.

Table A.17 provides further descriptive evidence on the rising inequality between researchers after the COVID-19 shock. The share of seminar speakers with three or more presentations among the set of speakers in the sample increased from 7.4 percent in 2018/19 to 8.5 percent in 2020/21. This suggests that after the COVID-19 shock, presentations were more concentrated among a few speakers.³⁶

4.8. The relationship between seminars and citations at the paper level

Citations are relevant determinants of economists’ salaries (Gibson et al., 2017).³⁷ The Online Appendix documents a positive and significant *correlation* between the number of seminar presentations for papers presented before and not about COVID-19 and their citations, even when controlling for author fixed effects. Future research could be conducted to establish a causal relationship between seminars and citations.

³⁵ In the academic year 2022/23, 10.7 percent of seminars were held online. The likelihood of a seminar being conducted online increased by 2.5 percentage points when the speaker was female. This is the result of a regression as in column (3) of Table A.12 for the academic year 2022/23. When online seminars in the academic year 2022/23 are excluded, the coefficient estimate for the academic year 2022/23 falls to 4.2 percentage points.

³⁶ The concentration also increases when studying the distribution of seminar titles. The share of seminar titles presented more than four times increased from 1.90 percent in the fall of 2019 to 2.15 percent in the fall of 2020.

³⁷ Hamermesh (2018) surveys the literature on citations and labor market outcomes. Most studies find a positive association between citations and researchers’ labor market outcomes and salaries, for example, Ellison (2013).

Table 11

The association between seminar characteristics and the return to in-person seminars.

	(1) $\mathbb{1}(\text{Speaker is female}_{ihst})$	(2) $\mathbb{1}(\text{RePEc top 1 per.}_{ihst})$	(3) $\mathbb{1}(\text{RePEc top 1 per. 10 yrs. publ.}_{ihst})$	(4) $\mathbb{1}(\text{RePEc top YE}_{ihst})$	(5) $\ln(\text{Distance}_{ihst})$
$\mathbb{1}(t = \text{Academic year 2020/21})$	0.074*** (0.009)	0.003 (0.006)	0.033*** (0.009)	0.008* (0.005)	0.279*** (0.052)
$\mathbb{1}(t = \text{Academic year 2021/22})$	0.068*** (0.008)	-0.008 (0.006)	0.018* (0.009)	0.013** (0.005)	0.127** (0.053)
$\mathbb{1}(t = \text{Academic year 2022/23})$	0.049*** (0.008)	-0.013** (0.006)	-0.013* (0.007)	0.001 (0.004)	0.056 (0.041)
Host institution x Seminar series FE	Yes	Yes	Yes	Yes	Yes
Individual-level controls	Yes	Yes	Yes	Yes	Yes
R^2	0.080	0.272	0.148	0.069	0.171
Observations	17,295	12,298	12,298	12,298	16,241

Notes: Estimates of Eq. (2). The outcome in column (1) is a dummy variable equal to one, if the speaker is female. The outcome in column (2) is a dummy variable equal to one, if the speaker is ranked among the top 1 percent of researchers in terms of overall output in the RePEc database. The outcome in column (3) is a dummy variable equal to one, if the speaker is ranked among the top 1 percent of researchers based on publications in the last 10 years in the RePEc database. The outcome in column (4) is a dummy variable equal to one, if the speaker is ranked among the top 200 economists whose first publication in the RePEc database is no older than 10 years. The outcome in column (5) is the physical distance between the speakers' institution and the host institution. The specifications include a host institution-seminar series fixed effect. Individual-level controls are speakers' gender and experience in years after PhD award. The independent variables of interest are time dummies for the academic years 2020/21, 2021/22, and 2022/23. Standard errors in parentheses, clustered at the host institution-seminar series level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 12

The association between the number of seminars and the COVID-19 shock by speaker characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of seminars _{it}					
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{Speaker is female}_i)$	0.218*** (0.031)					
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{RePEc top } 1 \text{ per.}_i)$		0.232*** (0.077)				
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{RePEc top } 1 \text{ per. } 10 \text{ yrs. publ.}_i)$			0.250*** (0.077)			
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{RePEc top young economist}_i)$				0.158 (0.152)		
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{Editor at top journal}_i)$					0.006 (0.046)	
$\mathbb{1}(t = \text{Academic year } 2020/21) \times \mathbb{1}(\text{Editor at top } 5_i)$						0.401*** (0.125)
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual-level controls \times Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
R ²	0.384	0.376	0.377	0.376	0.384	0.386
Observations	19,509	13,922	13,922	13,922	19,509	19,509

Notes: Estimates of Eq. (3). The outcome in all columns is the number of seminars for a given speaker in the respective academic year. The regressions are estimated using OLS. The specifications include an individual fixed effect and time fixed effects. In addition, all regressions interact controls for gender and the year in which the PhD was awarded with time fixed effects. The regression in column (6) only controls for the year of PhD award interacted with time fixed effects. The independent variables of interest are speaker characteristics interacted with a time fixed effect for the COVID-19 shock. Standard errors in parentheses, clustered at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

5. Conclusion

Understanding the distributional effects of remote seminars on speakers of different gender and productivity is highly relevant for the profession as virtual seminars may remain an integral part in academic knowledge dissemination in a post-pandemic world. This paper uses the transition from in-person presentations of seminars to online presentations as an exogenous shock. Drawing on a novel and unique data set on seminars in economics worldwide, this study documents first evidence on the changing nature of seminars in economics following the COVID-19 shock. First, this paper shows that the overall number of seminars declined and that the decline was not driven by the short-run supply of speakers. Next, the distributional consequences of the COVID-19 shock are traced. The share of seminars held by women increased and even more so at medium distances, which suggests that the requirement to travel could be a barrier for women in accepting seminar invitations. The distribution of seminar speakers shifted toward researchers of higher productivity, where productivity was proxied by five different measures. The geography of knowledge dissemination changed significantly as the average distance between host and speaker institutions increased by 32 percent.

The lessons drawn in this paper may be applicable not only to economics but also to other research fields that experienced a similar transition in the organization of research seminars. From a normative perspective, the findings suggest that offering to hold a virtual seminar for medium-length distances may further reduce gender inequality over time. The ICT capabilities gained during the pandemic may mark the beginning of a new flexibility for all.

The existing literature has argued that inventors and workers gain from personal interactions (Lucas 2009, De La Roca and Puga 2016, Akcigit et al. 2018, Andrews 2020, Battiston et al. 2020, Atkin et al. 2022). Online seminars change the way in which speakers and the audience interact. Future research could trace the network effects of seminars in terms of collaboration. This would quantify the extent to which online seminars can serve as a substitute for in-person seminars in creating ties among researchers.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.euroecorev.2024.104677>.

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